METEOROLOGICAL OFFICE

NEWSLETTER

FOR

CLIMATOLOGICAL OBSERVERS

IN

ENGLAND AND WALES

No 4

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Produced by:

Met O 1
Observational Requirements and
Practices Branch
Eastern Road
Bracknell
Berkshire
RG12 2UR

EDITORIAL

With Spring just around the corner many people have already started thinking about holidays (I believe some even start thinking around Christmas but I am not among them - my bank balance is far too depressing then to contemplate such wild extravagance). Those of you not already booked up in Corfu or the Seychelles (and even those who are) might like to consider 5 days in the Costa del Reading. Not only are the daily activities varied and interesting but the entire package is free - food, accommodation and travel. On top of that munificence there is a daily allowance towards out-of-pocket expenses (such as telephoning one's nearest and dearest to tell him/her about the delights of the holiday, or celebrating a "Day of Snow or Sleet" in the well-stocked bar.)

I refer, of course, to the 5-day Met-breaks organised by George Swift Tours - none other than our Climatological Observers Course held at the Met O College, Shinfield Park, Reading. George tells me these are always well subscribed but if you have never attended one we will fit you in as soon as possible. For those of you who are new observers there is an especial welcome and the instructors (who are chosen particularly for their charm, wit, intelligence and good looks) will be pleased to explain the details of observing and reporting procedures. For those of you who are experienced observers but have never been on a course this is a good opportunity to brush up on practices and refresh one's knowledge on observing generally. The course is also intended to be an exchange of ideas and there is plenty of opportunity for discussion. This part of the course is considered to be important both to instructors and observers since there is much to be gained in such an exchange.

If you have attended a course some time ago we will be pleased to see you when there are places available so please do not think that once you have been there is no return. You may have to wait a little, however.

I hope to be visiting some stations in East Anglia later this year so I look forward to meeting observers there and at the College.

David Smith

Headquarters News

Several staff changes have taken place at HQ in recent weeks. John George who was in charge of Met O 3a, the Data and Publication section, has left HQ for London (Heathrow) Airport and returned to forecasting duties. John's helpful and friendly assistance in matters relating to our co-operating network will be very much missed by all in this section of Met O 1c(3).

L R ("Johnny") Walker until recently in charge of the Data Systems of Met O 8b takes over from John George and we welcome him to the team.

Fred Landon whose articles appear regularly in the Newsletter has moved on promotion from Met O 3a where he was responsible for many years for Quality Control of climat data. Most observers who have been on a co-operating observers course will recall that Fred always gave the talk on climat data and monthly returns on the Wednesday visit to HQ. Fred has joined us in Met O 1c(3) where he is now the Auxiliary Station Inspector. His job in Met O 3a has been taken over by Ray Warder from our Exeter office. Ray is now responsible for all Quality Control data sets (for stations in Gt Britain and Northern Ireland) and for all Quality Control queries (for England and Wales).

George Swift

NEWS OF STATIONS AND ADMIN NOTES

Since the last edition of the Newsletter, there have been a number of changes to the network with new stations opening at Rayleigh, Essex (private observers) and Dunkeswell, near Honiton (South West Water Authority). The SWWA have transferred the climatological station from Tavistock Reservoir to Kilworthy College, about 2 km. north of the previous station.

We welcome these new stations to the network and are sorry to lose the services of the following, though Aberdare and Llwynon continue to report data on a five-day week basis:

Aberdare, Welsh Water Authority

Aberystwyth, Ceredigion District Council

Chatham South, School

Coventry Airport, City Council

Dover, Royal Military School

Letchworth, Anglian Water Authority

Llwynon, Welsh Water Authority

Port Talbot, British Steel Corpn

Sutton Bridge, Potato Marketing Board

West Kirby, Hoylake UDC

Winchester, City Council

From the above one might assume that the network was considerably reduced last year but readers of Newsletter No. 3 will see that on balance our total numbers remain much the same.

May I remind all stations that time can be saved if requests for forms, stationery and instruments are addressed to us at Met O 1c(3), Eastern Road, Bracknell, Berkshire RG12 2UR. Requests for the above items sent to other Headquarters Branches will inevitably suffer some delay before being sent on to our office for attention.

George Swift

What is Met O 1?

The Official description of Met O 1 is "Observational Requirements and Practices" which does not convey to the layman, or the professional for that matter, the diverse activities and interests covered, each within its own right. To accommodate each of these special interests, Met O 1 is divided and sub-divided.

In earlier days Met O 1 was always looked upon as the Marine Division, well salted with ex-Ship's Captains, who offered expert advice on all Marine matters relating in any way to Meteorology. This is still true today but instead of commanding a Branch of the Met Office all to themselves, they now occupy Met O 1a.

Under Met O 1b are the Radio Sonde stations (instrumental soundings of the upper atmosphere at special stations in the British Isles), Observatories, Thunderstorm Location, Calibration of Runway Visual Range Systems on aerodromes and Field Trials and Special Projects.

Under the heading Met O 1c is the National Solar Radiation Centre and its Data Processing section; administration and inspection of Auxiliary, Climatological and Rainfall stations and motorway service areas which supply observations in plain language. The installation of Automatic Weather Stations throughout the country is organised from this section as well as advice on the instrumentation of oil-drilling rigs and Off-Shore Platforms in the North Sea and other coastal waters.

As some of these activities are so diverse we will invite short articles for your information and interest from each of these three divisions in subsequent Newsletters which will partly answer the question "What is Met O 1?" The first of these will appear in October 1980.

Désirée Allen

CLIMATOLOGICAL ENQUIRIES

All the returns made by observers come to Met O 3 (Climatological Services Branch). After they have been examined and subjected to quality control procedures, the data become available for answering enquiries relating to England and Wales by Met O 3b which is the section in the Branch responsible for dealing with them. Enquiries for Scotland are dealt with by Edinburgh and those relating to Northern Ireland by Belfast. This division is not rigid, and there is a ready exchange of data between all the offices in order to meet a more general enquiry which may overlap the borders.

The number of enquiries per month is about one thousand; they arrive in the branch by letter, telex, telephone and, more rarely, a personal visit. Some of them may involve co-operation with other branches which may have more specialised knowledge of some particular aspect of the enquiry but ultimately the consolidated reply is usually channelled through Met O 3b.

The range of the enquiries touches upon almost every aspect of human activity and the results of some of them will eventually affect, perhaps indirectly, the lives of almost everyone in this country. A County Council will re-assess its holding of snow clearing equipment. On the basis of the data provided by the Meteorological Office it will try to decide whether it can justify the considerable expenditure required to meet the conditions such as we experienced last winter. On the same grounds British Rail may re-examine their position. Snow or ice on conductor rails and freezing rain falling on the railways overhead power lines can disrupt traffic over large areas of the country. A new motorway may be planned. Will route A be more liable to fog than route B. In all these cases, the questions arise on how often does it happen and how long does it last when it does occur? Enquiries of this nature cover large areas of the country and to answer them requires a large amount of data for many years. In these cases access to the data in the computer now provides a means of making such information available

relatively quickly. The assembled data represent the sum of the individual efforts of observers all over the country.

But by no means all enquiries require output from the computer. A considerable majority are received from individuals, or from solicitors representing them, who have been involved in an incident of one sort or another. It is in this sort of enquiry that a particular return from a station becomes of great significance. Some of these may be dealt with quite simply by photo-copying the relevant return when they arise just down the road from an observing station reporting to us but such is the perversity of life that this rarely happens and the records of several stations will need to be consulted. A straight extract may be all that is required but in a lot of cases a certified statement may be needed for presentation in a Court of Law. These certified statements are extracts from the records which are attested as being true. In most cases they are accepted by the Courts without a personal appearance but occasionally the actual presence of one of the staff from the Branch is required together with the original return. Records which have been altered for one reason or another can then give rise to questions on the validity of the data in relation to the matter in dispute.

Returns from stations are also used by providing the basis for monitoring the climate of the country. For this work the slow but careful accumulation of long term data is required. There are no short cuts and every year added to the records of a station is a positive achievement for which we in the enquiries section are grateful.

I suppose most people in this country think that, in general, we just shrug our shoulders and make the best of our weather. You do not need to have answered enquiries for very long to realise that even quite small departures from the average or even an isolated occurrence of some aspect of the weather will have affected someone somewhere enough to make them ask for more information about it. It is upon accurate and informative returns that the enquiries section depends for most of its information.

Peter Jeffries

An Application of Climatological Data - The calculation of Long Term Irrigation Need

As you may know there is a branch of the Meteorological Office called 'Agriculture and Hydrometeorology'. The Agricultural Section is not concerned with weather forecasting but with the effects of weather on agriculture. About half of the staff is based at the Met Office Headquarters at Bracknell and the other half at regional offices of the Agricultural Development and Advisory Service (ADAS). The Section does not work in isolation but keeps in close touch with the agricultural community through the ADAS Offices and is involved with Research Institutes such as the Grassland Research Institute and the Soil Survey of England and Wales, as well as commercial firms. Recently the Section has provided display stands at the Royal Show, the British Growers Look Ahead at Brighton and the Dairy Event.

In the Agricultural Section considerable use is made of climatological data; one example of this use is in the calculation of long term irrigation need. Early in 1980 a computer-based scheme to do this will come into operation. It will replace the less accurate existing method which relies on the use of a large number of maps which appear in the 'Atlas of Long Term Irrigation Need', published in 1967. To use the new scheme a farmer will describe precisely the way in which he proposes to irrigate his land and the crops he expects to grow. He will plan to apply a certain amount of water when his soil has reached a given state of dryness expressed as the 'soil moisture deficit', eg he may apply 15 mm when the soil moisture deficit 'SMD' has reached 20 mm. The larger the SMD the greater the water shortage of the plant; if the SMD becomes too large its growth is checked. By irrigating, the SMD can be kept low during the summer months. With permanent crops such as tree and bush fruits careful irrigation improves the produce not only in the current year but in succeeding years. In the drier areas of the country irrigation of grassland is likely to increase grass yields by about 30% on average. In addition irrigation equipment can be used for applying fertilizers and pesticides and the sprinkling of water on cold nights can be used to protect against frost.

The time taken for the soil to reach a given SMD depends on the relative amounts of rainfall and evaporation. The rainfall is measured directly, the evaporation can be calculated from the sunshine duration, run of wind, temperature and vapour pressure (found from the dew point). Thus if there is 1 mm of rainfall and 5 mm of evaporation in a day the soil moisture deficit will increase by 4 mm. After 5 such days the SMD would reach 20 mm - time to irrigate again in our example.

Climatological data are used to 'run' the farmer's suggested irrigation scheme using a specially written computer program. We pick the Observing Station nearest to his farm and run the program using, say, the past 20 years' climatological data. It may tell us that 4 years out of 5 the farmer needs to apply a total of less than 75 mm of water but that in the driest year in ten 100 mm may be needed. This information helps him to decide on the irrigation equipment that will best do the job for him and the water supply that he will need. At Tring in Herefordshire in 1977 a 5,000,000 gallon irrigation reservoir was built at a cost of £21,000 to supply equipment costing £28,000. Clearly with large investment such as this it is most important to plan carefully.

Malcolm Field

(Any queries or requests for further information should be addressed to Malcolm Field, Met O 8a, Met Office, London Road, Bracknell, Berks (Bracknell 20242 Ext 2755) and not to the Editor.)

"WHITE DRY RAIN"

The winter of 1978/79 proved to be one of the most difficult winters for snow measurements. After the relatively mild and generally snow-free winters of the last few years it came as a shock to many observers to be faced in the early morning with this dry white stuff rather than the orderly easily measured wet rain. Some of our newer observers must have been confronted with snow measurement for the very first time.

The first fact that must be understood is that snow is only frozen rain and requires measurement in the same way as rainfall. The amount of precipitation falling as snow has exactly the same effect on land, rivers, reservoirs, etc as if it had been raining although of course the snow will have to melt before it can be absorbed.

Gentle snow in light winds gives little trouble to observers. If it is not snowing at the observation time then a little measured warm water added to the raingauge which is, of course, subtracted from the "total" of rain measured before entering into the 'Daily Register', will quickly give you the rainfall equivalent of the snow or the gauge funnel may be brought into a warmer building and the snow melted and then measured. If it is snowing at the time of the observation then the added warm water method is probably the best method.

Strong winds and heavy snowfall can however be somewhat of a problem if not an absolute nightmare. The sheer discomfort of wintry conditions means that observations may be hurried and great credit is due to observers when determined efforts are made to produce good results.

If the gauge is buried then core samples are probably the best method to use. Remove the gauge funnel and with it inverted cut out cylindrical samples of snow. These can be melted indoors and an average taken. If the snow is deeper than the funnel then two or more bites at the core must be taken. It is obviously important that the samples come from an area representative of the station. Strong winds may blow the snow from level ground piling it up against fences trees hedges etc. There is no easy answer to this problem.

On some days last winter conditions were so bad that measurement was impossible and when conditions are so bad then an estimate should be made of snow amounts and depths.

Snow depth measurement is equally important. With good snow depth measurements we can estimate water equivalents. A rough guide to snow depth measurement is that 1 mm of rain would produce about 1 cm of snow depth if falling for the whole amount as snow.

Remember also that snow depth measurements, from at least three different positions, are always measured in centimetres NOT millimetres.

More detailed instructions are given in the Observers' Handbook Page 143 paragraph 9.5.

The lengths our observers do go to to achieve their observations is quite remarkable. One remote station requires a visit first by Land-Rover and then a long trek on skis. The observer once reported being somewhat perturbed to find that due to snow blindness he had found himself standing in the middle of a reservoir. Fortunately the ice was thick enough to support him. Its just as well all observers do not have these extreme problems but there is no doubt that any snow measurement is difficult and always uncomfortable and we are extremely grateful for the expert observations we get.

Fred Landon

To: The Editor of the Newsletter for Climatological Observers
in England and Wales,
Met O 1

Climatological Research Group
Met O 3
Bracknell

31 January 1980

Dear Sir

The letter by Mr Johns in the October 1979 edition of the newsletter raises an interesting point: namely, how frequently do we experience the "mean" weather? The mean of a set of observations is defined simply that the average deviation from it is zero. It is not necessarily the value most commonly observed. For example, the mean cloud amount at Heathrow Airport for the years 1957 - 76 was 5/8 yet only 5% of the hourly observations recorded 5/8 cloud compared to 31% recording 8/8.

The odds on the occurrence of the events stated by Mr Johns viz for monthly means, recording sunshine within one hour of the average, rainfall within one millimetre of the average and mean temperature within 0.2°C of the average are (based on Alderney data) about 14000 to 1 or 1 month in 1200 years! This result is based on fairly loose statistical assumptions and is true for only one station. Since there are about 650 climatological stations the odds on any one of you observing the above results are considerably less than this.

In a previous newsletter, Mr Whitaker at Dore expressed some regret that he might not be able to build up 30 years of data for the purpose of producing averages. A study has recently been completed by the Climatological Research Group in Met O 3 which sought to determine, for maximum and minimum temperatures, the length of averaging period most appropriate for producing estimates of temperatures in future years. We found that in general 30 years was about the optimum length but in certain cases 15 - 20 years was sufficient. The group is currently investigating the usefulness of the present climatological network for defining our climate and determining the important factors that influence the climate of any particular locality. The scope of our work is substantially enhanced by the wealth of

observations reported by the many voluntary and co-operating stations existing in the UK.

S. G. Smith

S G Smith

Yarner Wood
Bovey Tracey
Devon

I was interested in the correspondence about the occurrence of grass minima higher than air minima. We have recorded this several times and have had some of our records queried by Met O 3.

Occasionally it has happened when there has been overnight snow cover which has presumably insulated the grass (minimum) thermometer from the cold air above it. However we have more often recorded it in the absence of snow so it looked as if Frank Hill's letter in the October 1979 issue might provide the answer. As we keep a record of 0900 grass temperatures for research on soil temperatures I have the data to check his theory.

In 1979 we recorded grass minima higher than air minima on 11 days when there was no snow cover. If we disregard three days when the difference between the grass and air minima was only 0.2 or 0.1 and one when our data were not accepted by Met O 3 we are left with 7 valid occurrences. Frank Hill's theory requires the previous day's 0900 grass temperature and the (same day's) grass minimum both to be higher than the previous day's 0900 air temperature. This occurred only on 11 May when the air minimum was 6.5, grass minimum 8.1, previous day's air temperature 8.0 and (previous day's) grass (minimum) temperature 9.0 at 0900.

This is not to say that Frank Hill's theory is incorrect but it is obviously not the only explanation. Anymore ideas?

D A Rogers, Senior Warden

Editor:

Mr Rogers' letter was referred to the Principal Meteorological Officer at Plymouth, Norman Hormbrey, who replied:

To the suggestions already made I can only add that a cause of artificially low air minimum readings is quite often the vibration of the screen in windy weather (a check of the quoted (by Mr Rogers) 11 dates shows that gales were blowing at Plymouth at 6 of them), coupled with the slight "downhill" inclination of the air minimum thermometers. (I have been able to demonstrate this at 2 stations.)

The solutions are simple - firm-up the screen stand and decrease the angle of slope of the thermometer mounting.

N F Hormbrey, P Met O Plymouth

CAVENDISH, SUDBURY, SUFFOLK

During the time that I have been making weather observations, and completing the "Weather Diary" I have often used terms such as "fine", "dull", "overcast", "dreary" etc etc to describe the daily weather. Whereas I know my own meanings of these terms I have sometimes wondered if my interpretations are correct, and indeed if some words are normally used. I was therefore wondering if there is a glossary of these and similar terms, or some publication that I can obtain, which has the information in order that I can use the correct terms. Perhaps your department could help?

Yours sincerely

Michael Pizzey

Dear Mr Pizzey

Thank you for your letter dated 11 October 1979. The Observers Handbook should be consulted for guidance on terms used to describe weather phenomena such as rain, showers, snow, hail, thunderstorms and so on.

It is difficult to recommend an official publication which offers definitions of the words you quote such as "fine", "dull", "overcast", as these do not appear in the Observers Handbook or the Meteorological Glossary which gives explanations of technical meteorological terms.

Our Public Services section Met O 7a has provided a list of some definitions for the guidance of staff who prepare weather messaged for issue to the general public and you may find the attached list of some help.

Yours sincerely

George Swift

PS. If you are interested in obtaining a copy of the Meteorological Glossary, it may be purchased from HMSO or Government Bookshops at the current price of £2.75.

METEOROLOGICAL TERMS

(Only terms used in a different sense from that of the Meteorological Glossary, or not included in that work, are listed here).

"Bright" With considerable diffuse sunshine and perhaps some direct sunshine. The term is retained with this meaning because there is no better one but it is apt to be misunderstood since many people, especially photographers, consider "bright" and "sunny" as synonymous. If possible, therefore, it should be accompanied by some amplifying word eg "bright" with only very thin/well broken cloud. The comparative "brighter" is often a useful word.

"Cloudy" With cloud nearly or completely covering sky. Cloud mostly dense enough to prevent sun casting shadows.

"Damp" OED definition "Moisture in the air, slightly wet". Should not be used as it has no generally accepted meaning.

"Dry" No precipitation or fog. Care is needed in the use of this word when dealing with the farming community. They use this term in relation to the dryness of the ground or the crops; a day without precipitation or fog may be quite 'wet' to a farmer if there has been overnight rain or heavy dew.

"Dull" Complete cover of cloud dense enough to create an impression of darkness or gloom even at the time of full daylight.

"Fair" Should not be used as it has no generally accepted meaning.

"Fine" — No precipitation or thick fog. Some sunshine by day, moon or stars visible at night. (Fine is never an adequate description of weather by itself - it needs to be accompanied by some description of the expected cloud. When both "fine" and "sunny" are applicable "sunny" is to be preferred).

"Sunny" — With sunshine most of the time.

"Sunny periods" — Mostly sunny for an hour or two at a time and, in all, more sunshine than cloud.

"Sunny intervals" — With intermittent sunshine for a total of less than half the period.

"Wet" — OED definition "rainy weather". A useful term to describe a period of rainy weather eg a morning or a night, but see also the notes under dry.

'Sowdensleigh'
Chawleigh
Clumleigh
Devon

I thought that you might be interested to know that recently, whilst on holiday in Iceland, I visited the headquarters of the Iceland Weather Bureau in Reykjavik. I simply walked in, and told them who I was and what I did - I was made most welcome, indeed they told me that they were very pleased to have me there and then showed me around all their departments and the weather station outside. Most of the instruments were foreign mainly Norwegian, I found the raingauges interesting - they use as standard a 250 sq cm funnel which is mounted some 5 ft above ground

with a met wind shield some 3 ft across protecting the gauge. Another gauge of the same type is mounted some 12 ft - 15 ft above ground and is read only once a year. It would be interesting to know what Met O 3 think about these gauges. The other bureau also had a gauge at ground level, which gave different results I was told. The thermometer screens were some 6 ft above ground. However in general things were very similar to here.

Yours sincerely

M Sampson

Comment by Met O 8b

The raingauge used as the "Icelandic Standard" is set about 5 feet above ground level to lift the rim clear of the worst of the drift snow. The wind shield - probably a Nipher type from the description - in addition to improving the flow across the gauge also prevents the entrance of drift snow. The large funnel diameter is to prevent "capping" by wet snow.

The annual gauge would normally be sited in spots inaccessible during the winter. The one held at Reykjavik is probably used to compare its catch with that of the standard gauge.

Any normal gauge raised above ground level will catch less rain than the ground flush gauge. The difference increases as the height of the rim is increased.

H G Hills

Weather in the United Kingdom
July - December 1979

The unsettled weather at the end of June gave way to a fine, dry spell in most districts during the first few days of July. Periods of somewhat changeable weather then alternated with more settled, warmer conditions although in the south dry and often warm weather continued until the 28th. The warmest day of the month over most of England, Wales and Northern Ireland occurred on the 27th, when temperatures of at least 30 °C were recorded at several places in southern England. On the 28th and 29th rain and thunderstorms spread to many areas with heavy falls in places, particularly on the 29th, when 75 mm fell at Mumby in Lincolnshire (most of it in 2 hours) and lightning killed a six-year-old child at Skegness. Generally cool and unsettled weather then continued until the last week of August; gales occurred around mid-month, being particularly severe in south-western areas on the 14th. Yachts taking part in the Fastnet Race were caught in this storm and 23 yachts were abandoned or sunk with the loss of 15 lives; 4 other yachtsmen lost their lives in the same area and the gales also led to several fatalities on land. During the last week of August there was a more settled spell but changeable weather returned to western areas on the 31st. Throughout September changeable conditions affected north-western districts with periods of rain or showers occurring at times. Areas away from the north-west were often dry, sunny and warm during the first half of the month, but from mid-month onwards daytime temperatures were generally lower everywhere and frost occurred on several nights. October was a generally mild month with maximum temperatures of around 22 °C being recorded at several places in England and Wales between the 7th and 9th. The night of 8th/9th was also unusually warm in many areas; at Manchester Airport the minimum of 16.8 °C on that night was the highest in any October in the Manchester area since records began there in 1877. The mild weather lasted until the end of the first week of November in most areas, but the period from 8 to 17 November was cold everywhere. Some of the nights were exceptionally cold; on the 12th/13th severe frost occurred in many parts of the United Kingdom with minima below -10 °C at a few places in Scotland and northern England, and even as far south as the Bournmouth area -6.0 °C was recorded. From the 18th onwards milder conditions returned to all districts and persisted until mid-December. Around the middle of December there were severe gales in some areas, particularly

in the south-west, where a gust of 103 kt was recorded at Gwennap Head in Cornwall on the 15th. Most parts of the United Kingdom were colder between the 19th and 24th with a little snow falling in places, but temperatures then returned to nearer the normal for the rest of the month. There was heavy rainfall in many areas at times during December; the 7th was a very wet day over most of Scotland, the 13th was one of the wettest days of the year over England and Wales as a whole and on the 26th/27th very heavy rain over southern parts of Britain led to extensive flooding in south-west England and South Wales with damage estimated at several million pounds.

Observational Techniques

Perhaps we should mention one or two points which have arisen during our liaison visits this year and which may be of general interest to observers.

a. Wet bulb muslin - We recommend that this should be changed at least once per week in urban areas, more frequently at coastal stations if wind is off the sea and every two or three weeks at stations in the country.

b. Stevenson Screens - We do suggest that these are painted both inside and out. We realise that it may not be possible to paint the screen and return the thermometers to it in the same day. We would recommend that a note is put on the monthly return to say that the screen is being painted and the relevant columns left blank on the day concerned.

c. A circle of gravel chips around the raingauge can sometimes prevent damage by over-enthusiastic mowers.

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